Remarks:

Please reconsider the application in view of the following remarks. The Applicant appreciates that the Examiner has found to be persuasive the argument made in response to the Office Action of May 23, 2005 with respect to Bowden (U.S. Patent No. 5,474,142) and that claim rejections based on Bowden have been withdrawn. The Applicant would also like to thank the Examiner for courtesies extended in a telephone interview of December 19, 2005. The following remarks are intended to confirm the substance of that telephone interview, and are intended to be responsive to the new ground of rejection cited in the Office Action of December 6, 2005.

Claim Rejections - 35 U.S.C. § 102(e)

Claims 1-4, 7 and 17-29 stand rejected as anticipated by Prior et al. (U.S. Patent Application Publication No. 2004/0226748). Applicant respectfully traverses the rejection to the extent it may apply to the amended claims. Applicant notes the similarity of the system disclosed in Prior et al. to the Applicant's claimed invention, however there are some important differences between the disclosed system and the Applicant's claimed invention.

First, with respect to claim 1, Applicant's invention includes an electric servo motor arranged to operate a winch brake control. It was asserted in the Office Action of December 6, 2005 that a motor shown by reference numeral 55 in Prior et al. is a servo motor. Such assertion does not appear to be correct. Element 55 is shown more clearly in Figure 2 of Prior et al. as the actual motor which drives the winch. The motor 55 is used to cause the winch to retract the drilling line 45, thus pulling on the drill string to cause a reaming tool to "ream" (enlarge the diameter) an already drilled well hole by moving a reaming tool upwardly in the wellbore while the drill string is rotated. The operation of the motor 55 is clearly described in paragraph [0036] of Prior et al.

[0036] The control system 110 then utilizes control signals from the various sensors 7C to calculate and monitor the reaming parameters, and these values are compared versus the limits on those parameters input by the operator, to ensure that the back reaming operation is performed within the operator limits. If the measured values from the sensors match or exceed the limits

input by the operator, the CPU sends a signal to the brake actuator, which in turn controls the braking system 70 to apply a torque to resist the hoisting torque of the drawworks motor(s) 55 and control the rate of hoisting of the drill string, to in turn maintain the limits input by the operator for ROH, POB, and/or the drilling torque. The CPU commands the braking system 70 to apply a torque that resists the hoisting torque of the drawworks motor(s) 55 such that the hoisting speed is reduced until the relevant maximum value is no longer exceeded, and then commands the brake actuator to reduce the resisting torque of the brake system 70 to allow the drawworks motor(s) 55 to increase the speed of hoisting.

Applicant does not dispute that Prior et al. shows a "motor" as indicated by reference numeral 55 and as more fully described in the text thereof. Applicant does not agree, however, that the disclosed motor is a servo motor, as recited in Applicant's claim 1. The term "servo motor" has an ordinarily understood meaning to those skilled in the art of process automation, and the Applicant respectfully calls the Examiner's attention to publicly available documents in which the common meaning of the term "servo motor" is clearly described. For example, an Internet page displayed at the following URL address, maintained by the Seattle Robotics Society,

http://www.seattlerobotics.org/guide/servos.html

clearly describes a "servo" as follows:

"[a] Servo is a small device that has an output shaft. This shaft can be positioned to specific angular positions by sending the servo a coded signal. As long as the coded signal exists on the input line, the servo will maintain the angular position of the shaft. As the coded signal changes, the angular position of the shaft changes. In practice, servos are used in radio controlled airplanes to position control surfaces like the elevators and rudders. They are also used in radio controlled cars, puppets, and of course, robots."

The Applicant's use of the phrase "electric servo motor" is clearly consistent with the foregoing commonly understood use of the term servo, in that the angular or rotational position of the servo motor in the Applicant's claimed invention is the basis by which a winch brake control is moved to a selected position. The controller in the Applicant's claimed invention sends control signals to the servo motor to cause it to rotate to the selected position such that a selected movement characteristic of the rig winch drum is maintained. Motor 55 in Prior et al. is merely a "motor", meaning that it is used to rotate the drawworks drum shown in the drilling unit in Prior et al. The

motor 55 in Prior et al. cannot be reasonably described as a servo motor, because there is no description in Prior et al. to the effect that the rotational position (or angular position) of such motor 55 is measured, used or described in any manner whatsoever. Applicant also respectfully submits herewith the Declaration of Ertugrul Akhmeshe in support of the Applicant's use of the term servo motor and to distinguish what is shown in Prior et al. The motor 55 in Prior et al. has as its only function the movement of the drawworks drum. Accordingly, at least one element of Applicant's claim 1 is not disclosed in Prior et al.

Further, the Applicant does not agree that a "servo motor" as that term is properly construed, even if arguably shown in Prior et al., is shown in Prior et al. as "arranged to operate a winch brake control", as recited in claim 1. Applicant points out that the device described in Prior et al. as operating the winch brake control is "actuated either hydraulically or pneumatically, using, for example, a pneumatic cylinder that is applied by rig air pressure that is modulated by control signals 109 issued by the control system 110...." See Prior et al. page 2, paragraph [0024]. Prior et al. therefore does not disclose or suggest using an electric servo motor to operate the winch brake control, as recited in the Applicant's claims.

Accordingly, another affirmative limitation recited in Applicant's claim 1 is clearly absent from the disclosure in Prior et al., and therefore claim 1 cannot be anticipated by Prior et al.

Applicant notes the Examiner's statement in the Office Action of December 6, 2005 in which Applicant's earlier statement of certain features of the invention were not part of the claims being argued, Applicant respectfully agrees. However, Applicant did not make such statements with the intent to argue that the claimed invention was not anticipated, but rather that the claimed invention is clearly not obvious over Prior et al. As stated in the Applicant's previous Reply:

"The foregoing recitation of an electric servo motor is not a trivial or insubstantial distinction between the Prior et al. disclosure and the Applicant's claimed invention. Applicant respectfully notes that in the Background of the Invention in the Applicant's Specification, reference is made to the fact that:

> [a]dapting computer control to conventional drawworks motion control devices has also been difficult. A primary source of the difficulty is the fact that conventional drawworks friction brakes are band-type brakes. As is well known in the art, band-type brakes are self-actuating. This aspect of the typical band-type drawworks has made their response difficult to characterize. As a result, it has been believed by those skilled in the art that computer control of conventional band-type brakes is impracticable. See, for example, Boyadjieff et al., *Design Considerations and Field Performance of an Advanced Automatic Driller*, paper no. SPE/IADC 79827, Society of Petroleum Engineers, Richardson, Tex. (2003).

Applicant notes that conventional actuators, such as pneumatic cylinders and the like have proven to be unsuitable for automatic drilling systems where band brakes are used. Applicant does not make this assertion merely of his own accord, but respectfully points out that the first named author of the foregoing reference was formerly chairman and CEO of Varco, Inc. (now National Oilwell Varco) one of the world's largest manufacturers of drilling rig equipment and control systems. Applicant is not in a position to determine whether the system disclosed in Prior et al. functions well for its intended purpose, however, the Applicant also notes that the system disclosed in Prior et al. is intended to be used for back reaming, as explained above, wherein the winch is operated to exert a pull on the drill string, and the brake is used to offset the pull so as to maintain a selected drilling parameter. This action is opposite the intended use of the Applicant's invention, wherein the drill string is released into the wellbore by Earth's gravity, and the winch brake acts against gravity, thus controlling the rate of release. Before the Applicant's invention, it was believed that suitable computerized control of a winch having band brakes for regular drilling (as opposed to back reaming) was impracticable. See the Boyadjieff et al. paper referenced above. The Applicant has determined that an electric servo motor can provide the required degree of precision in control of a winch brake used in conventional drilling, even when the winch is equipped with band brakes. The Prior et al. reference does not disclose or suggest an electric servo motor operatively coupled to the winch brake controller as the solution to the problem of band brakes. Accordingly, Prior et al. cannot anticipate claim 1. Applicant does not herein disclaim applicability of his invention to use in back reaming, however, the Applicant notes that the device shown in Prior et al. is intended to be used for back reaming, and in view of the express statements in the Boyadjieff et al. paper referenced above, there would be no motivation to use the device shown in Prior et al. to emulate the operation of the Applicant's claimed invention."

The point being made by the Applicant above is that the difference between what is claimed and what is disclosed in Prior et al. being use of an electric servo motor to operate the winch brake control, to the extent the Examiner may assert the triviality or insubstantiality of such difference, the Applicant respectfully notes that: 1) the device disclosed in Prior et al. is used for a substantially different purpose than the device of the Applicant's claimed invention; and 2) one of the largest and most experienced drilling equipment manufacturers in the industry declared publicly that what the Applicant was intending to do with the claimed invention was not believed

to be practicable. Accordingly, the Applicant believes that claim 1 is clearly patentable over the art of record.

Claims 2-16 ultimately depend from claim 1 and are patentable over Prior et al. for at least the same reasons advanced with respect to claim 1.

With respect to claim 17, Prior et al. does not disclose "measuring a parameter related to position of a drawworks brake." Measuring a parameter related to the position of the brake is used, as explained in the Applicant's specification, to provide a feedback signal to assure that the electric servo motor operates the brake controller precisely. The only thing disclosed in Prior et al. is that the system controller operates a brake actuator. There is nothing in Prior et al. that requires any determination of the position of the brake, if for no other reason than the system disclose in Prior et al. does not use an electric servo motor to actuate the brake control. The Applicant has again reviewed paragraph [0028] of Prior et al. cited by the Examiner as disclosing measuring a parameter related to the position of a drawworks brake. The only statement made in paragraph [0028], as the Examiner correctly noted is that the control system "is in signal communication with the brake assembly." The Applicant refers to the statement made in paragraph [0024] of Prior et al. that the signal communication 109 is actually the controller supplying operating signals to the brake actuator, and not receiving signals from any sensor that measures a parameter related to brake position.

The Applicant does not dispute that the controller in Prior et al. receives signals from various sensors, including a load sensing device and encoder and a torque sensor. However, the Applicant respectfully calls the Examiner's attention to paragraph [0025] which describes the load sensing device as producing a signal representative of the tension in the dead line. The Examiner is also respectfully referred to paragraph [0026] which describes the encoder as generating a signal corresponding to the rate of rotation of the winch drum. Finally, the Examiner is also respectfully referred to paragraph [0027] which describes the measurement made by the torque sensor as sensing the torque on the top drive or rotary table. There is no mention whatsoever in Prior et al. of any device of any kind that measures a parameter related to

the position of the drawworks brake. Accordingly, Prior et al. cannot anticipate claim 17. Applicant has also amended claim 17 to clarify that both the drum encoder (position of which drum) and servo encoder (position of winch brake controller) are used to control the speed of the winch drum, which is clearly not shown in Prior et al.

Claim 27 as amended recites that an electric servo motor is coupled to a drawworks winch brake drum actuator. Such structure is neither disclosed nor implied in Prior et al. as explained above with respect to claim 1. Accordingly, claim 27 cannot be anticipated by Prior et al. Claims 28-31 ultimately depend from claim 27 and are likewise patentable over Prior et al.

The Applicant believes that this Reply is fully responsive to each and every ground of rejection and objection cited in the Office Action of December 6, 2005, and respectfully requests early favorable action on this application.

Respectfully submitted,

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